

# PATENT COOPERATION TREATY

From the  
INTERNATIONAL SEARCHING AUTHORITY

To:

see form PCTISA220

## PCT

WRITTEN OPINION OF THE  
INTERNATIONAL SEARCHING AUTHORITY  
(PCT Rule 43bis.1)

Date of mailing  
(day-month-year) see form PCTISA210 (second sheet)

Applicant's or agent's file reference  
see form PCTISA220

**FOR FURTHER ACTION**  
See paragraph 2 below

International application No.  
PCT/GB2005/000490

International filing date (day-month-year)  
14.02.2005

Priority date (day-month-year)  
13.02.2004

International Patent Classification (IPC) or both national classification and IPC  
H01L29/65, H01L21/20

Applicant  
IQE SILICON COMPOUNDS LTD

1. This opinion contains indications relating to the following items:

- ☒ Box No. I Basis of the opinion
- ☒ Box No. II Priority
- ☐ Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- ☐ Box No. IV Lack of unity of invention
- ☒ Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability: citations and explanations supporting such statement
- ☐ Box No. VI Certain documents cited
- ☐ Box No. VII Certain defects in the international application
- ☒ Box No. VIII Certain observations on the international application

### 2 FURTHER ACTION

If a demand for international preliminary examination is made, this opinion will usually be considered to be a written opinion of the International Preliminary Examining Authority ("IPEA"). However, this does not apply where the applicant chooses an Authority other than this one to be the IPEA and the chosen IPEA has notified the International Bureau under Rule 56.1bis(b) that written opinions of this International Searching Authority will not be so considered.

If this opinion is, as provided above, considered to be a written opinion of the IPEA, the applicant is invited to submit to the IPEA a written reply together, where appropriate, with amendments, before the expiration of three months from the date of mailing of Form PCTISA220 or before the expiration of 22 months from the priority date, whichever expires later.

For further options, see Form PCTISA220.

3 For further details, see notes to Form PCTISA220.

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**WRITTEN OPINION OF THE  
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**Box No. I Basis of the opinion**

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1. With regard to the **language**, this opinion has been established on the basis of the international application in the language in which it was filed, unless otherwise indicated under this item.
  - ☐ This opinion has been established on the basis of a translation from the original language into the following language \_\_\_\_\_, which is the language of a translation furnished for the purposes of international search (under Rules 12.3 and 23 1(b)).
2. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application and necessary to the claimed invention, this opinion has been established on the basis of:
  - a. type of material:
    - ☐ a sequence listing
    - ☐ table(s) related to the sequence listing
  - b. format of material:
    - ☐ in written format
    - ☐ in computer readable form
  - c. time of filing/furnishing:
    - ☐ contained in the international application as filed.
    - ☐ filed together with the international application in computer readable form
    - ☐ furnished subsequently to this Authority for the purposes of search.
3. ☐ In addition, in the case that more than one version or copy of a sequence listing and/or table relating thereto has been filed or furnished, the required statements that the information in the subsequent or additional copies is identical to that in the application as filed or does not go beyond the application as filed, as appropriate, were furnished.
4. Additional comments:

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**Box No. II Priority**

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1. ☒ The validity of the priority claim has not been considered because the International Searching Authority does not have in its possession a copy of the earlier application whose priority has been claimed or, where required, a translation of that earlier application. This opinion has nevertheless been established on the assumption that the relevant date (Rules 43bis.1 and 64.1) is the claimed priority date.
2. ☐ This opinion has been established as if no priority had been claimed due to the fact that the priority claim has been found invalid (Rules 43bis.1 and 64.1). Thus for the purposes of this opinion, the international filing date indicated above is considered to be the relevant date.
3. Additional observations, if necessary.

**WRITTEN OPINION OF THE  
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**Box No. V Reasoned statement under Rule 43b/s.1(a)(i) with regard to novelty, inventive step or industrial applicability: citations and explanations supporting such statement**

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1. Statement

Novelty (N)	Yes: Claims	
	No: Claims	1-15
Inventive step (IS)	Yes: Claims	
	No: Claims	1-18
Industrial applicability (IA)	Yes: Claims	1-18
	No: Claims	

2 Citations and explanations

**see separate sheet**

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**Box No. VIII Certain observations on the international application**

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The following observations on the clarity of the claims, description, and drawings or on the question whether the claims are fully supported by the description, are made:

**see separate sheet**

**Re Item V**

**Reasoned statement with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement**

1. Reference is made to the following documents:

- D1: US 2002/017642 A1 (MIZUSHIMA KAZUKI ET AL) 14 February 2002 (2002-02-14)
- D2: US 2002/125475 A1 (CHU JACK OON ET AL) 12 September 2002 (2002-09-12)
- D3: WO 03/103031 A (UNIVERSITY OF WARWICK: CAPEWELL, ADAM, DANIEL; GRASBY, TIMOTHY, JOHN;) 11 December 2003 (2003-12-11)
- D4: ROMANATO F ET AL: "Continuously graded buffers for InGaAs/GaAs structures grown on GaAs" JOURNAL OF CRYSTAL GROWTH, NORTH-HOLLAND, AMSTERDAM, NL, vol. 175-176, May 1997 (1997-05), pages 1009-1015, XP004091436 ISSN: 0022-0248
- D5. PATENT ABSTRACTS OF JAPAN vol. 2003, no. 11, 5 November 2003 (2003-11-05) & JP 2003 197544 A (SUMITOMO MITSUBISHI SILICON CORP), 11 July 2003 (2003-07-11)

2. The present application does not meet the criteria of Article 33(1) PCT, because the subject-matter of claims 1-18 is not new in the sense of Article 33(2) PCT.

2.1 The document D1 discloses (see in particular figure 2) a semiconductor device comprising a substrate of a first semiconductor material (Si) and a compound layer of said first semiconductor material (Si) and a second semiconductor material (Ge), the ratio of Si to Ge of the compound layer decreases from the substrate to the upper surface of the compound layer, and rate of decrease of this ratio varies within said layer.

Hence the subject-matter of claims 1, 12, 13 and 18 is not new (Article 33(2) PCT).

2.2 The document D1 discloses furthermore that the rate of decrease of the ratio varies non-linearly, that the ratio remains constant between points disposed intermediate the compound layer, that a final layer comprising Si is applied on said compound layer, and that the compound layer comprises at its upper surface 22,5% of Germanium (D1,

paragraph [0051].

Hence the subject-matter of dependent claims 4, 5, 7-11 and 16 is not new (Article 33(2) PCT).

2.3 Dependent claims 2,3,6,14,15 and 17 do not contain any features which, in combination with the features of any claim to which they refer, meet the requirements of the PCT in respect of novelty, see documents D2, D3, D4 and D5 and the corresponding passages cited in the search report.

#### **Re Item VIII**

#### **Certain observations on the international application**

3. The subject-matter of claims 12 and 18 relies on references to Figures 3 and 4. This renders claims 12 and 18 unclear in violation of Art. 6 PCT and Rule 6.2(a) PCT.